

# The Mining Journal

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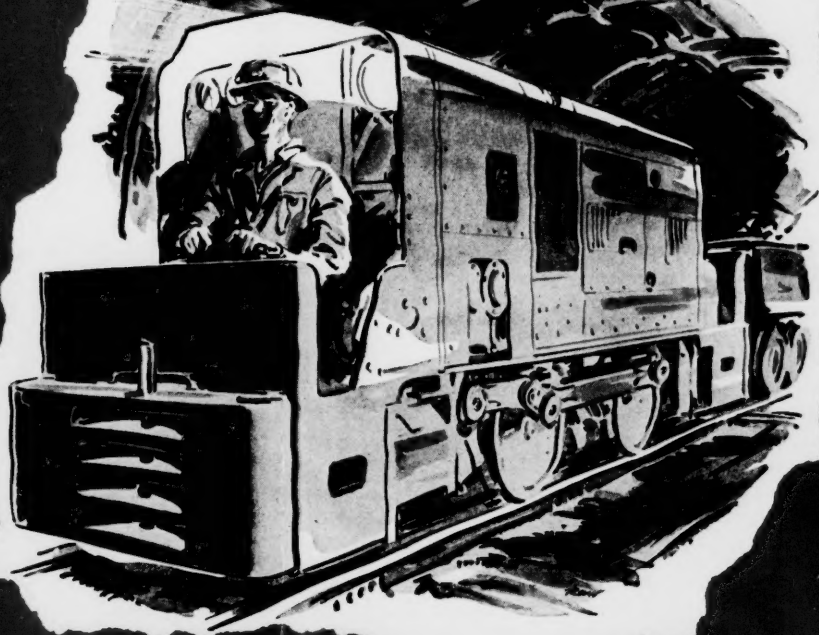
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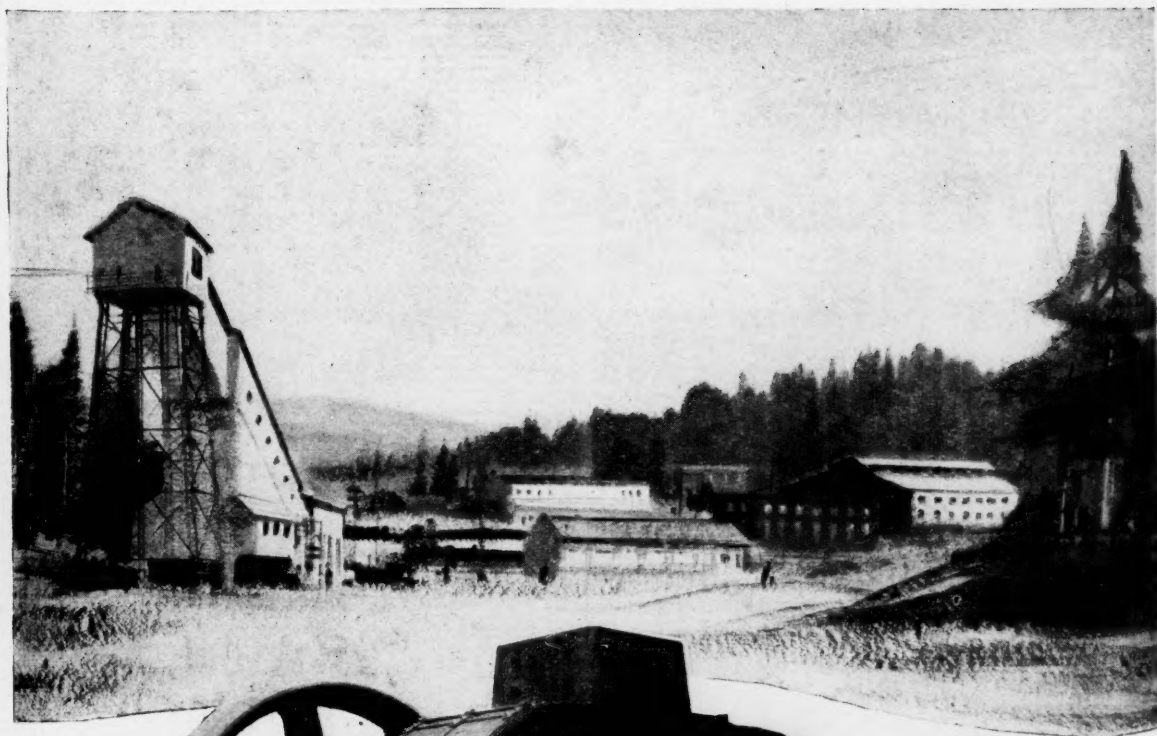
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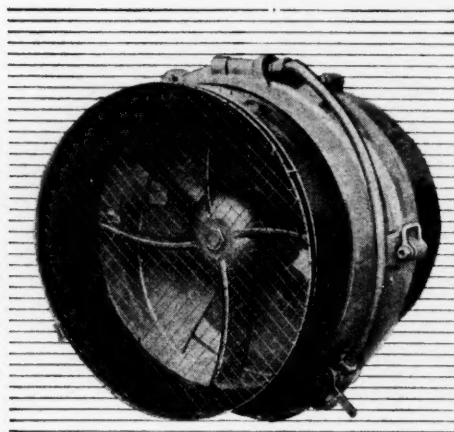
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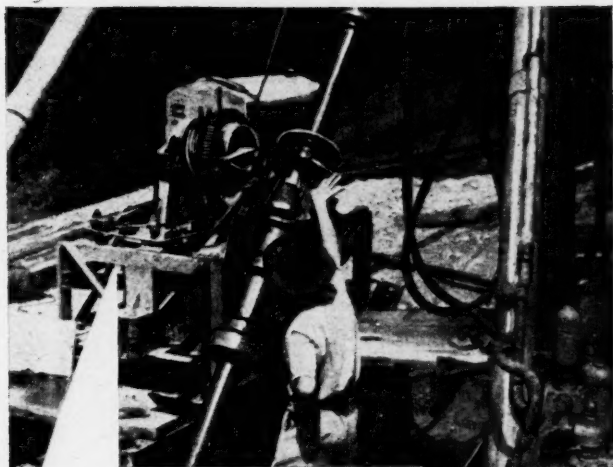
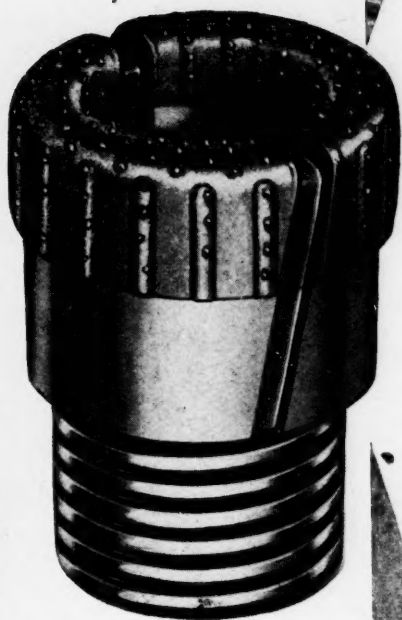
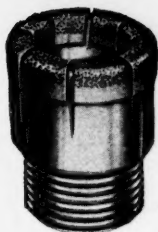
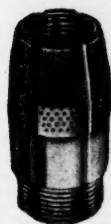
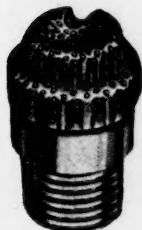
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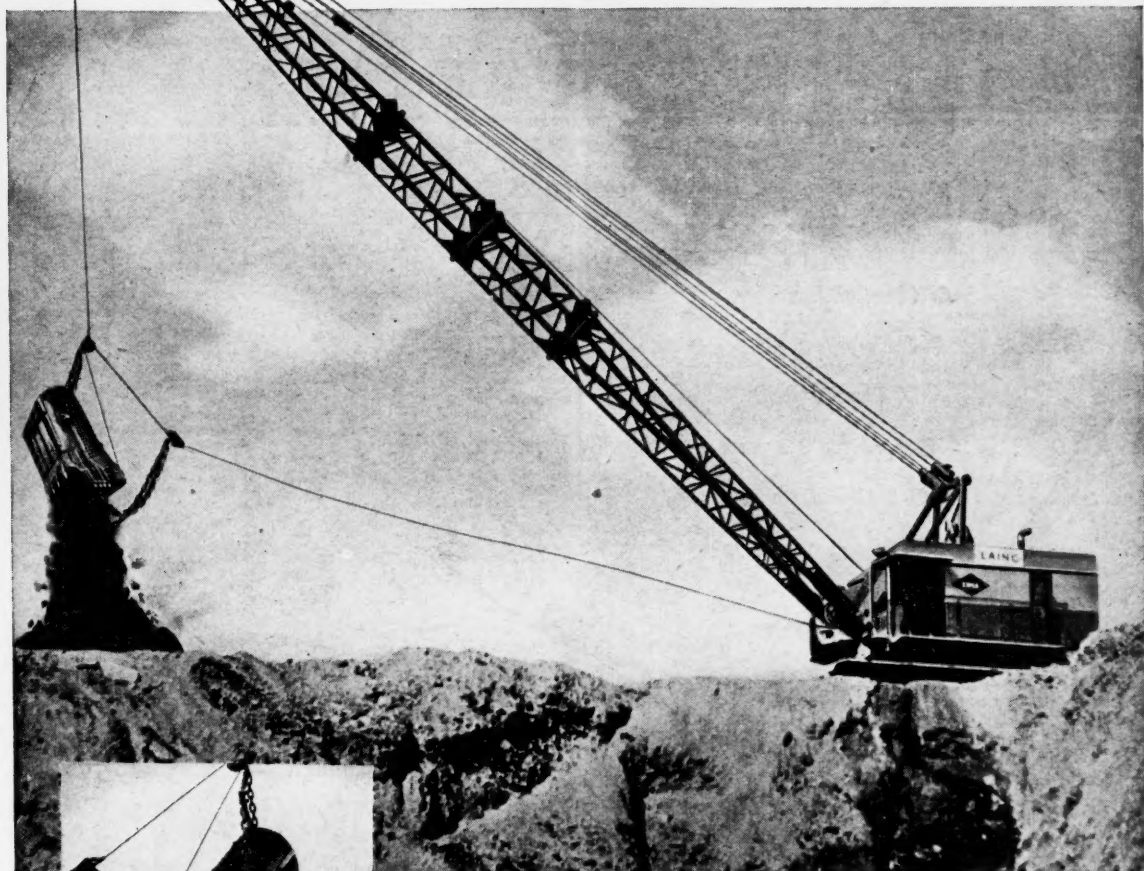
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## NOTES AND COMMENTS

### The Outlook for Tin

The reports of the U.S. Bureau of Mines and the International Tin Study Group, published in our issue of last week, have stimulated many speculations regarding the probable trend of tin prices and production in the future. While the figures may be subject to some further correction the broad result is that there was apparent a surplus of output over consumption of some 43,000 tons, which if it stood alone would suggest that prices must soon show a very marked decline over the average of  $121\frac{1}{2}$  c. which has ruled in the United States for over a year and has largely influenced quotations elsewhere. However, the fact remains that excess production has long been recognized to exist and the United States price has not varied, and obviously there must be substantial reasons for this stability. The explanation is that the R.F.C. have continued to buy or take in large quantities of tin at their fixed price, with the result that stocks held by the R.F.C. and industry increased from 40,448 tons at the beginning of 1952 to 61,413 tons at the end of 1952. The increase was almost entirely in R.F.C. stocks. Obviously this piling up of supplies cannot continue indefinitely even if the R.F.C.'s career is not terminated at mid-summer. Consequently production must decline materially or the R.F.C. must dispose of the surplus tin.

It seems impossible to suppose that consumption in the U.S. and indeed elsewhere can absorb at best more than a small proportion of the excess. The attitude of the United States consumer has been set forth in a statement by Mr. C. A. Ilgenfritz of the United States Steel Corporation, the U.S. principal tin consumer, reported in the bulletin of the National Association of Purchasing Agents. He is reported as saying that no matter how optimistic some forecasters may be on the future requirements of U.S. tin consumers, "tin at the equivalent of  $\$1.21\frac{1}{2}$  is not going to be used if anything cheaper can be found to do the job. Many arguments can be found to justify the present price, but the fact remains that tin at its present price is a very expensive metal."

Therefore the practical alternative then remains of further increases in the Government stockpile, the size of which has long been a closely-guarded secret. The U.S. Bureau of Mines says that a substantial tonnage was added

to the stockpile last year. So long as the national stockpile can be regarded as a gigantic buffer stock all may be well, but should substitutes for tin assume a greater magnitude then, as Mr. Ilgenfritz seemed to hint, a limit may be reached which the United States Government would consider sufficient insurance against future uncertainties, and in any case one day much of the stock will probably be liquidated. The school of thought which expects stable or enhanced prices for the metal to rule relies considerably on the extent to which current prices and political developments are likely to reduce world output. All that can be said on this point is that under current conditions world output actually increased last year and consequently, from a purely economic point of view at any rate, it seems somewhat rash to assume that this tendency may not continue.

However, any early cessation of purchases by the R.F.C. or lowering of its price appears unlikely owing to the existence of earlier contracts more particularly with Indonesia, Belgium, and possibly with other minor producers, entered into around the existing price of  $\$1.21\frac{1}{2}$ , which still have, as far as is known, about a year to run before the option date to terminate is reached. It is difficult to see the R.F.C. buying at one price and selling at a lower one. The International Tin Study Group is to meet in London next Monday and the question of over production of tin must be one of the principal subjects to claim their attention.

### Where do we Stand with Government Stock

The U.K. primary metal statistics for January summarized on page 334 are notable for the fact that stock figures for lead and zinc are, from the beginning of 1953, being shown exclusive of Government-held stocks. Thus, in the case of lead, the British Bureau of Non-Ferrous Metal Statistics reports year-end metal stocks at 75,510 tons, whereas the opening stocks on January 1, 1953, only appear as 23,090 tons, suggesting that Government stocks at this date were approximately 50,000 tons.

The Government Broker announced some three weeks ago that he had disposed of the entire tonnage of lead allocated for sale through the Metal Exchange, and it is believed generally that the Ministry of Materials has no

present intention of effecting any further sales of lead. It therefore seems reasonable to assume that this Government stock of 50,000 tons may be regarded as off the market, at any rate for the time being. How much of this tonnage will eventually find its way into the Government's strategic lead reserve (which it has been announced in Parliament is to be established) there is of course no means of knowing.

In the case of the U.K. zinc stock figures, the change in basis of reporting has occurred between January 1 and January 31. Thus U.K. stocks at January 1 are reported as 166,050 tons, whereas the figure at the end of the month was 16,545 tons, excluding Government-held stocks. Without knowing exactly what proportion of the 24,000 tons earmarked by the Ministry for the Commonwealth producers back in December has already been delivered to them, it is difficult to get an exact picture of the extent of Government stocks at the end of January, but they cannot very well have been less than 130,000 tons, and may well have been more.

So far there has been no official indication of what is going to be done with this substantial tonnage, although it seems reasonable to assume that once the Commonwealth producers have absorbed the 24,000 tons already allocated to them, the Ministry will seek to unload further tonnages of Empire zinc through the same channels. Even so, it would appear that the Ministry will have to find some means of disposing of at least 100,000 tons. As long as this tonnage is overhanging the world market without any certainty as to whether any of it is to be stockpiled, and under what conditions the balance is going to be disposed of, its existence can only help to depress the market.

In one sense this is admittedly unavoidable in that the Ministry must rightly be anxious to get the best price and hardest currency for its surplus stocks. On the other hand this purpose will not be achieved in a depressed market and it should not be beyond the ingenuity of the Ministry to mitigate the unsettling influence of these stocks by some such device as an assurance that they will eventually be liquidated no faster than at some specified monthly rate while of course still adhering to its undertaking not to deal in such a way as to depress the market. This would, in effect, be little more than an extension of the principle which the Ministry has already established by announcing in advance the amount of zinc which it had agreed to sell back to producers during the first six months of this year.

Beyond this, it is not possible for us to be told what tonnages are to be frozen in the stockpiles. This applies of course to other metals besides lead and zinc, and far more to U.S. stocks than to our own. *The Mining Journal* has yet to be convinced that secrecy in this matter is worth the cost. In the first place, stockpiles can, up to a point, be deduced, secrecy or no. Secondly, stable commodity markets represent an important economic weapon of defence in the cold war. Uncertainty either as to the extent of Government stockpiles or still more as to policy concerning their use may in the years ahead do us more damage economically in the cold war than the advantage of attempted concealment may gain for us in any eventual shooting war.

#### International Nickel

The report of the International Nickel Co. of Canada for 1952 was issued this week and will, no doubt, form the backbone of the Chairman's speech to the shareholders in Toronto on April 29 next. The report states generally that production of metals was maintained at capacity. Deliveries of nickel in all forms totalled 124,508 s.tons as compared with 121,933 s.tons in 1951. Copper output was slightly lower at 117,162 s.tons compared with 118,472 s.tons in the previous year. Output of the platinum metals was 287,135 f.oz. as compared with 375,438 f.oz. in the previous year. Gold production was 42,396 f.oz. compared with 38,016

f.oz. and that of silver 1,076,437 f.oz. as against 1,027,921 f.oz.

These figures do not reveal much change from those of the previous year, with the exception of the platinum metals which declined by 88,303 oz. The decline would appear to have been chiefly in palladium as platinum deliveries are stated to be in pace with production capacities, and the decrease is attributed to the offering of a considerable volume of palladium from other sources. It may also be that the ore treated during the year was of lower platinum content. Possibly the Chairman will have something to say on this point at the annual meeting.

The gradual conversion of the Company's mining operations to underground working developed further and out of a total of ore mined of 13,248,593 s.tons as compared with 11,779,320 in 1951 underground workings supplied 10,196,068 s.tons against 7,780,143 s.tons and surface workings 3,052,525 against 4,019,177. The quantity of ore mined was the highest hitherto recorded. The conversion from surface to underground work has been proceeding as planned and in course of realization for several years past, and will no doubt continue, as hoisting capacity is being enlarged to some 13,000,000 tons annually. The chief means by which the expansion of underground mining has been effected has been the successful operation of the Creighton caving project which has permitted the recovery and treatment of lower grade ore than had been accomplished in the past. Additional blocks were developed to supply the increased capacity of the Creighton concentrator which by mid-summer will handle some 12,000 s.tons per day. A second underground crushing installation is now nearly finished. Development of the Creighton lower areas was continued during the year and the shaft reached 5,562 ft. from surface, the lowest working level being 5,425 ft., the deepest level in the mine. In the Frood section of the Frood-Stobie mine a modification of the induced caving method was practised called the "blasthole" system in which explosives are used to cave the ore.

After the current year it is anticipated that all ore from this body will have to be drawn from underground. Owing to the excavation of the No. 8 shaft by rises from several different levels simultaneously completion was advanced by some 20 months and shafts should be available for regular hoisting by the middle of the current year. Deepening of the existing shafts at the Levack Mine will allow hoisting from levels down to 2,650 ft. and preliminary work to extend them to the 4,000 ft. level is in hand. The main shaft at the Garson Mine was further deepened during the year.

In the reduction of copper concentrates oxygen flash smelting was carried out on a commercial basis. In this process all smelting heat requirements are met by the reaction of the charge with oxygen and the process is described as an important advance in non-ferrous extraction metallurgy. By this method large scale production of liquid  $SO_2$  is obtained as a by-product, moreover the production of acid from Copper Cliff smelter gases was increased. Important progress is said to have been made in the electrolytic and carbonyl processes at Port Colborne and Clydach respectively. Refinery residues at Clydach are now treated by a hydrometallurgical process. At the Acton Refinery ion-exchange methods have been introduced in the refining of rhodium.

Research on the development of an economic process for treating nickel-bearing pyrrhotite to yield nickel and iron oxide is stated to have been successful in full scale experiments. Much work was done both in England and the United States on the further development of high strength alloys for jet engines.

The Company expended some \$U.S.5,000,000 in exploring for new sources of nickel, more particularly in Manitoba and the North West territories, besides locations elsewhere in Canada and in other parts of the world.



At the end of the year the Company had in its employment 26,742 persons the highest number hitherto attained. Incidentally, it is interesting to learn that the Soviet Government which had undertaken to pay \$U.S.20,000,000 for the Petsamo mines by the end of 1951 was short paid by nearly \$3,000,000. No further payments were made during 1952 and the satisfaction of the amount overdue is under discussion between the Canadian and Soviet Governments.

## South Africa

(From Our Own Correspondent)

Johannesburg, March 5.

Development work in the Free State mines is reflecting an increasing tempo, and it looks as if before the year is out one record after another will be broken. Part of this is due to mechanization, particularly the use of mechanical loaders, but probably even to a greater degree the use of trained teams of European and native workers who operate together for long spells.

Actual figures will not be available until the March quarterly reports, but in recent weeks semi-official news has been forthcoming from Free State sources. One of the most interesting was that the first bar of gold will be poured at Freddie's South in May. Although no official claim has been staked, it is considered that this will constitute a record for the shortest time from the completion of shaft-sinking to actual production in any gold mine of this depth and size. It is understood that the same applies to its twin, Freddie's North, and that there will be a joint opening ceremony in two months' time.

A high rate of progress is also being maintained at Western Holdings, where a waste rock pass was started in the No. 2 shaft section. By the end of the month 247 feet has been completed in this and another linked level and 11 feet of development accomplished. Free State miners are of the opinion that this must be somewhere in the region of record figures.

### APTITUDE TESTS FOR NATIVES

The training of underground teams is continuing on an increasing scale, but in addition the application of aptitude tests to raw native recruits is bearing fruit. Since the testing centre was opened at Freddie's a number of groups of between 30 to 36 natives each have passed through it. The centre aims at determining the boy's intelligence and his particular turn of mind.

The first set of tests are of the usual nature including sorting. Since a wide variety of dialects and languages are spoken by the recruits silent films are used to show them what they have to do with the various test sets. In one case the test is done three times—once after seeing the explanatory film; once after he has been shown the completed article, and a third time without being shown any picture. By means of this, it is possible to gauge whether the recruit has the ability to realize where he has made a mistake and whether he can correct it.

The natives scoring top marks in these tests, are then put through a leadership test. They are taken to a ground where they are told to move a number of objects over varied type of obstacles. These require the application of the principles of leverage and other basic mechanical concepts. It is usually found that they stand around for a while and then one of them speaks up and the others follow his ideas or are inspired to do something better. Arising out of these tests recruits are marked out as possible future "boss boys."

In the years since shaft-sinking started in the Free State considerable information has emerged on the most suitable types of shafts and sinking techniques. A most interesting

summary of possible developments in this direction is contained in a paper recently read by T. F. Muller and C. Skeen on shaft-sinking on the Virginia and Merriespruit mines. They are of the opinion that the circular shaft will find an ever-widening application on account of its merits in respect of mine ventilation, suitability in broken or water-bearing ground, increasingly good sinking rate and relative economy. Should the use of concrete buntons—as used in these two mines—prove satisfactory, it is to be anticipated that these will be used extensively in future designs. In the past during sinking circular shafts rope guides have been used for hoisting and moving equipment, but it seems that in future the tendency will be towards the installation of permanent buntons and guides as sinking progresses.

### STUDY OF SHAFT SINKING METHODS

So far as sinking equipment is concerned, the double-deck sinking platform offers many advantages. Wherever possible two single-drum winders should be used to one double-drum unit. The winders should be of sufficient size and capable of completing the sinking programme without interruption. Permanent headgears offer important advantages over temporary structures in regard to clearance above the bank and valuable time is saved in obviating changeovers at a later stage.

The authors state that a strong case can be made out for mechanical shaft-cleaning methods under certain circumstances, where the capacity of hoisting facilities exceeds that of the number of hand-lashers that can conveniently be accommodated in the shaft bottom, and also where the conveyances that can be handled by the hoists have a capacity in excess of three or four tons, and consequently become unduly high for comfortable hand-lashing. It is also suitable where frequent interruptions to sinking are caused due to water trouble or other reasons, when hand-lashing labour becomes redundant and cannot be employed efficiently at the shaft. Furthermore, in view of the increasing shortage of labour, the undoubted progress being made with mechanical shaft-cleaning may lead to a state of affairs where allocations of labour will only be made for those mining processes which do not lend themselves to performance by mechanical means. The shortage of labour, as in every other field, must provide the greatest stimulus to further design and experimenting for mechanization of shaft sinking.

### NEW CEMENTATION TECHNIQUES SUGGESTED

So far as cementation is concerned, the authors make some suggestions in view of the large proportion of time absorbed by this. Although the high-pressure reciprocating cementation pump is admirably suited to the treatment of tight fissures offering great resistance to the injection of grout, fissures are intersected where large volumes of grout are pumped at relatively low head before the desired back pressure is built up. It is felt that the initial treatment could be made by means of pumps of a larger volumetric capacity, even of a centrifugal type. Improved chemical means might be sought to accelerate the deposition of cementing material on wide fissure walls. There would seem to be vast potentialities opened up by the possibility of pre-cementing a shaft area before the start of shaft-sinking and subsequently advancing through the plug so formed without interruption.

The expedient of using four sinking crews working in rotation is an expensive one. It is, however, a proved device for increasing the rate of sinking and can be justified where the standard of equipment available, the method of sinking employed, and the natural ground conditions anticipated are such as to ensure a relatively high speed without interruption.

# Yugoslavia's Expanding Mining Industry

By A. G. THOMSON

The visit of Marshal Tito to the United Kingdom has focussed attention on Yugoslavia. Hitherto an agricultural country, Yugoslavia is, nevertheless, endowed with rich mineral resources, and its expanding mining industry is marking a transition from primary agrarian dependency to a revised balance wherein extractive industries are playing an increasingly important part.

During the early post-war years Yugoslavia's foreign trade was almost entirely dependent on the U.S.S.R. and its satellite countries. Since 1948, however, the pattern of imports and exports has been entirely altered and to-day Yugoslavia is trading with countries all over the world. Last year Yugoslav exports to Britain were valued at £16,000,000, while Britain sent £10,000,000 worth of goods to Yugoslavia. Under the latest Anglo-Yugoslav trade agreement Britain is granting a soft-currency open general licence for certain Yugoslav goods, among the items placed on O.G.L. by Britain being chemical minerals. In general, the agreement covers much the same type of goods as that of last year.

Yugoslavia is the largest producer of non-ferrous ores in Western Europe. Production and exports are being rapidly increased and represent a contribution of growing importance to the West. Since 1949, no non-ferrous metals have been exported to Cominform countries, in spite of the higher prices offered by various trade agents.

## COMPREHENSIVE DEVELOPMENT PROGRAMME

The expansion of the mining and metal industries is gradually reducing the country's present critical dependence on agriculture and should lead to a general improvement in living standards. Hopes were expressed that the increased raw material output last year would be sufficient to cover foreign trade, which in 1951 showed an adverse balance equivalent to \$117,000,000. Unfortunately the gains in metal exports have been offset by the effects of a severe drought which has necessitated temporary restrictions on the imports of certain articles not at present essential to the country's economic progress. Despite the heavy damage done to the economic life of the country by the drought, official statistics show that the level of industrial production fell last year by only 1 per cent as compared with 1951. Among the industries showing increased activity were electric power (6 per cent), oil (3 per cent), ferrous metals (10 per cent), non-ferrous metals (7 per cent), and non-metallic minerals (16 per cent).

With technical and financial assistance from Britain, France and the United States, Yugoslavia has embarked on an ambitious programme of economic development, based on exploitation of the rich mineral resources with which she has been abundantly endowed. According to figures released by the Mutual Security Agency she received about \$102,500,000 in aid between April, 1948, and October, 1952. Of this amount \$12,371,000 was for iron and steel mill materials and products including ferro-alloys. Assistance in connection with non-ferrous metals and products totalled about \$2,230,590 and included \$322,000 for copper, \$1,250,000 for aluminium, \$638,000 for brass and bronze, and about \$20,000 for nickel. Early this year M.S.A. announced that it had authorized Yugoslavia to spend \$2,240,000 in new purchases, consisting mainly of iron and steel mill materials and products. Many millions of dollars have also been made available in loans and investments from the International Bank and Western countries. These large sums are being used mainly for the purchase of equipment for mines, factories and collieries, and the construction of power houses. Enterprises already in existence are being enlarged and modernized, while others are under construction.

Last year's capital investment programme called for an

expenditure of 156,400,000,000 dinars, of which 107,639,000,000 were to be sunk in industrial and mining construction schemes. The programme involved the completion during the year of about a hundred mines, industrial plants and power stations. Plans for 1953 include the investment of 1,200,000,000 dinars in the development of non-ferrous metal industries, the main object being to switch from exports of ores and concentrates to semi-manufactures and finished schemes.

## IMPORTANT NON-DOLLAR LOAN

The World Bank recently announced the granting to Yugoslavia of a loan equivalent to \$30,000,000. No dollars will be loaned, however, the currencies involved including Austrian schillings, sterling, lire, D-marks, guilders, Norwegian and Swedish crowns, and Swiss, Belgian and French francs. This loan will pay for the import of equipment needed for 27 projects in seven sectors of the Yugoslav economy, namely: electric power generation and distribution; coal mining; extraction and processing of non-ferrous metals; iron and steel production; other manufacturing industries; forestry and transport. Most of the projects which the Bank's loan will help to finance are expected to be completed within the next year or two, and all should be in operation by 1956. They will make important contributions to a 30 per cent overall increase in industrial production expected by 1955.

Projects to be financed under the loan are expected to improve Yugoslavia's balance of payments position by the equivalent of \$50,000,000 a year. Increased exports of such items as aluminium steel tubes, copper wire and cable, and coal will account for more than half this improvement, the balance being achieved by savings effected through the reduction of imports of iron and steel products, non-ferrous metals and newsprint. Additional benefits will come from increased industrial efficiency, a reduction of manpower requirements and low production costs.

Formerly Yugoslavia's non-ferrous metal industry was controlled from Belgrade, but in July, 1950, centralized administrative control boards were abolished and a policy of wide decentralization came into force. Each industry and each mine is now an independent organization handled by a Workers' Council with full powers and responsibilities which operates through its board of directors.

Yugoslavia is the largest producer in Europe, excluding the U.S.S.R., of copper, lead, silver, antimony and chrome ores, the second largest smelter of copper and producer of bauxite, and the third largest producer of refined lead, antimony regulus, mercury and bismuth.

During the war the Germans denuded the country of her known antimony reserves, so that in 1944 it was necessary to create new reserves before mining could be restarted. All the reserves now known are the result of post-war prospecting and efforts are being made to find additional occurrences. The main deposits are those of the Zajaca basin near Loznica in Serbia, of which the Krupanj properties form part. Production of antimony ore was 55,088 tonnes in 1951, compared with 80,534 tons in 1950 and 18,963 tons in 1939. During the period January-August last year the monthly average was 6,391 tons, compared with 4,684 tons for the corresponding period of 1951.

Europe's first plant to treat antimony ores by the flotation process was constructed at Zajaca, where an antimony

smelter is also in operation. In addition to a number of small flotation plants in the vicinity, a large one is now being built. The production of antimony regulus was increased from the pre-war rate of 1,500 tonnes to 1,815 tons in 1950, but fell to only two-thirds of this in 1951 and was increased comparatively little last year.

### COPPER PRODUCTION

Yugoslavia's only copper producer is the Bor mine in eastern Serbia, formerly operated by the French and now known as Rudnici Bakara i Topionice Bor. During the war the Germans mined the best ore, so that lower-grade ores are now being worked, necessitating the employment of a larger labour force. About two-thirds of the production is from open pit working and one-third from underground working. At 1,173,320 tonnes the output of the Bor copper mines in 1951 was the highest on record, and in the eight months of this year production was running at the annual rate of almost 1,275,000 tonnes. The 15,000 ton electrolytic plant has been expanded to produce about 24,000 tons a year of refined copper 99.95 per cent pure.

The increasing difficulty encountered in working the Bor deposits, which have now been exploited for decades, has enhanced the importance of occurrences at Majdanpek in Serbia, where geological exploration has shown proved reserves of some 100,000,000 tons with a copper content of 0.9 per cent. A new mine with a capacity of 15,000-16,000 tons annually will be opened and should come into production in about three years. All mining will be open pit. A smelter with an initial smelting capacity of some 40,000 tons a year will handle the ore from both mines and the roaster gases will be used to make sulphuric acid. An output of 100,000 tons annually is envisaged within the next ten years.

Copper smelting is at present in a state of transition and this has resulted in lower output. The Bor smelter was twice destroyed by the Germans but by 1950 was back to the pre-war output of 40,000 tons. In view of the new plant under erection no modernization has been carried out at the existing smelter and output fell in 1951 to 32,000 tons.

Copper rolling mills in Sevojno, near Titovo Uzice, are raising their capacity to 24,000 tons of copper and brass semi-manufactures and will be able to cover the whole of the country's requirements. It is hoped that a surplus will be available for export. Plants financed under the new loan will enable Yugoslavia to manufacture its own copper wire and cable.

### ALUMINIUM AND QUICKSILVER

Extensive deposits of bauxite exist at Istria (near Trieste), Drnis (Dalmatia), Mostar (Herzegovina) and Niksie (Montenegro). The ore is a very good grade and contains from 50 to 70 per cent monohydrates with silica ranging for the most part from 1 to 2 per cent. The country's bauxite reserves are estimated at over 100,000,000 tons. As part of a development programme to increase production the bauxite mines are being mechanized and an order for prospecting and mining equipment has been placed with Western Germany. In 1951, the output of bauxite from the Dalmatian Coast area increased by 125 per cent over the previous year and was 42 per cent above the 1939 output. In recent months it has approached an annual rate of 750,000 tonnes, which is not much below that of France.

About 3,000 tonnes of aluminium a year is produced by the Bayer process at Lozovac in Dalmatia, and there is an alumina plant at Moste in Slovenia with an annual output of 8,000 tons. The output of aluminium ingots has been expanded since the war and reached 2,828 tonnes in 1951, compared with 1,931 in 1950, 561 tonnes in 1946, and 1,705 tonnes in 1939. There was a decline last year, however, the average output for the first ten months being only

205 tons compared with 230 tons in the corresponding period of 1951.

Yugoslavia still has to import aluminium. In 1951 imports amounted to 1,550 tonnes and an average of 865 tonnes annually was imported in 1947-51.

Self-sufficiency will be achieved by the completion of a large new works at Strnisce, Slovenia (which is being constructed with American assistance). It has a planned capacity of some 55,000 tonnes of alumina and 30,000 tonnes of aluminium a year. New processing plants financed under the new loan will produce an additional 60,000 tons of alumina and 15,000 tons of aluminium. By 1954, Yugoslavia hopes to be producing 22,500 tonnes of aluminium ingots and 23,000 tonnes of aluminium rolled products. In the first ten months of last year she produced 2,049 tonnes of ingots and 1,500 tonnes of rolled products.

Deposits of quicksilver in Idrija, which have been known for hundreds of years, were returned to Yugoslavia by Italy after the war. Though the equipment was obsolete, dilapidated and out of date, Yugoslavia has since been producing some 11 per cent of the world's mercury output and is Europe's third largest producer. Between 1947 and 1951 900,000,000 dinars were spent on the plant and new methods have been introduced in order to use lower grade ore. Production has been steadily expanded and now exceeds 500,000 kg. of mercury a year. This is considered to be the highest output achieved since exploitation of the mine began over 450 years ago and is about 200,000 kg. greater than normal yearly production before the war. Most of the mercury is exported to the United States, Switzerland, Scandinavia and Western Germany. Further expansion is anticipated in the immediate future and Yugoslav mining experts believe that, despite a steady decline in the metal content of the ores (from 0.808 per cent in 1940 to 0.540 per cent in 1951), an output of 600 tonnes a year will be achieved in three or four years' time. No further large-scale capital expenditure will be required. There are other quicksilver mines in various parts of Yugoslavia, but their production is on a relatively small scale compared with that of the Idrija mine, on which most of the extensive exploration for quicksilver is therefore being concentrated. Idrija's reserves appear to be inexhaustible.

### OTHER MINERALS

In 1951, Yugoslavia exported 51,716 tonnes of lead and production amounted to nearly 60,000 tonnes. Whereas large quantities of lead concentrates were shipped before the war, exports now consist exclusively of refined lead. During the first six months of last year exports of refined lead totalled 28,169 tons. The Trepca lead-zinc properties are the largest of their kind in Europe and used to be among the most prosperous. They are situated about 200 air kilometres south of Belgrade, where the main fracture of the Vardar zone running eastward meets a northern deviation. At Trepca there is a concentration of these deposits, the main minerals being galena, sphalerite, sulphur pyrites and pyrrhotine. Before the war the mine belonged to the British-owned Trepca Mines Ltd. and production costs were probably the lowest in the world. In 1940 output reached a peak of 698,760 tonnes, but by 1945 it had fallen to 121,459 tonnes. The following year this undertaking was nationalized by Yugoslavia and renamed Rudnici i Topionice Olova i Cinka Trepca. Production started to rise steadily and in 1951 it reached 700,000 tonnes. The ore assays 7.31 per cent lead, 4.77 per cent zinc, 31.11 per cent iron pyrites, and 0.15 per cent copper.

Ore from the Stari Trg mine, the Kaoponik mine, and the Ivajva group of mines is concentrated at the Zvecan mill. A new shaft is being sunk at Stari Trg, which is the principal Trepca mine, and three new levels are in operation. About 2,200 tonnes of ore are raised in a three-shift day and conveyed by aerial tramway to the concentrator 12



kilometres away. The reserves are estimated at 10,000,000 tonnes, but the grade of ore becomes progressively lower as the deeper levels are mined. The Zvečan mill and smelter are being extensively reconstructed and a large quantity of new equipment has arrived. An ultimate production of 70,000 tonnes of lead annually is envisaged, but difficulty is being experienced in increasing the labour force of 8,000 workers. The present output is about 55,000 tonnes. The zinc concentrates are sent to the Celje zinc plant in Slovenia.

A second mine near Baribor in Slovenia has a capacity of 10,000 tonnes of refined lead. The ore assays 6 per cent lead and 3 per cent zinc. The plant consists of a modern flotation mill, smelter and refinery, which produces a soft, refined pig lead of great purity known as "Mezica" brand. The zinc concentrate is treated at the neighbouring Celje smelter.

The Celje plant is an old one and was completely out of action after the war. The retorts have been restored and production has been doubled, the present output being 12,000 tonnes per annum of refined zinc more than 99.9 per cent pure. The construction of a new zinc electrolysis plant is a major item in the expansive programme.

#### FURTHER MINERAL DEVELOPMENT

Work on the development of Yugoslavia's first wolfram mine and plant for the separation of wolfram is nearing completion. Production of wolfram concentrate was expected to start towards the end of 1952 and the concentrate will be processed at Sibenik to produce ferro-tungsten. The mine will also produce certain quantities of gold. It is situated near Neresnica in Eastern Serbia, where important deposits of ore were discovered in 1949. The separation plant and part of the mine equipment were procured with the aid of a loan from the American Export-Import Bank.

Yugoslavia is one of the world's largest chrome ore producers. The ore is mined in the Radusa and Lojane Basins near Skoplje, in Macedonia, and also in the Deva Basin on the Albanian border. Three grades are produced; the first two classes have minimum  $\text{Cr}_2\text{O}_3$  contents of 48 and 44 per cent respectively, the third class being concentrates from third class ore enriched to 48 per cent  $\text{Cr}_2\text{O}_3$ . The ore is used largely for making ferro-chrome, which is produced at Ruse, near Maribor. An output of 2,900 tonnes of super-refined quality is exported annually and other qualities are produced for home consumption.

There is a magnesite mine at Goles, near Pristina, which will be equipped with plant to permit the production of 50,000 tonnes of caustically roasted magnesite, and two other new magnesite works are also planned. The "Magnochrom" factory now being built at Rankovicevo (formerly Kraljevo) will be able to turn out 100,000 tonnes of fire-brick annually.

Large deposits of chromium and magnesite have been discovered in south-west Serbia. The chromium deposits are estimated to amount to about 500,000 tonnes, while the quantity of the magnesite has not yet been established. Yugoslavia's chromium reserves, not including the newly found deposits, are estimated at 1,500,000 tonnes and her magnesite reserves at 7,000,000 tonnes.

The reserves of iron ore in the republic of Bosnia-Herzegovina are estimated at 130,000,000 tons. Output of iron ore at the Ljubija and Vares iron mines in Bosnia is being expanded and was expected to reach 1,500,000 tons of ores last year.

When new iron and steel plants now under construction are completed, Yugoslavia will produce annually about 2,500,000 tonnes of iron ore, 540,000 tonnes of pig iron, 900,000 tonnes of raw steel and 600,000 tonnes of rolled steel products. In 1951, she turned out 248,000 tonnes of pig iron, 434,000 tonnes of raw steel, 301,000 tonnes of rolled products, and 12,500 tonnes of drawn steel. In 1939, output amounted to only 101,000 tonnes of pig iron, 235,000

tonnes of raw steel, 151,000 tonnes of rolled products, and 2,500 tonnes of drawn steel.

Although a substantial number of new projects have been completed since the war, the peak of the construction programme is only now being passed with the completion of many new plants. In Zenica, Bosnia—which is fast replacing Jezenice, Slovenia, as Yugoslavia's biggest iron and steel centre—the following plants are being built: one coking plant (four batteries with 156 coke ovens, which will produce about 700,000 tonnes of coke a year); two blast furnaces (each turning out 600 tonnes of pig iron daily); a steel mill with four open-hearth furnaces; a blooming mill which will be among the most modern in Europe and will convert some 450,000 tonnes of raw steel a year; and a forge.

Two new blast furnaces were built in Sisak after the war and one was reconstructed. In addition, a steel mill is being built with two open-hearth furnaces, giving a total capacity of 90,000 tonnes of steel a year, while a rolling mill for seamless pipe will turn out about 60,000 tonnes of pipe ranging from 100 to 420 millimetres in size. At Jezenice a new rolling mill is being enlarged, an open-hearth furnace with a capacity of 45,000 tonnes a year is being completed, and a blast furnace is being rebuilt to increase its capacity by 30 per cent. Yugoslavia's first arc furnace for the production of special pig is being constructed in Store. At Gustanj, which concentrates on special steels, a steel mill is being erected and four arc furnaces under construction will increase production sixfold. A new rolling mill is being assembled in Smederovo and when this project is completed the present production of tinplate will be trebled.

Projects to be financed under the loan will increase the production capacity of iron ore by 900,000 tons annually, pig iron by 260,000 tons, and finished steel products by 195,000 tons.

#### EXPLORATION FOR METAL ORES

Intensive exploration for metal ores is under way in many parts of the country. The Geological Institute of Serbia has sent a new team into the field at Vlasotince, where large deposits of iron ore had previously been discovered. According to available results, the iron ore reserves there amount to some 200,000,000 tons. Teams organized by the Geological Institute of Macedonia are exploring iron ore deposits at Slepce, Tajmiste and Judovo, estimated at 30,000,000 tons. The deposits, situated between Prilep and Kicevo, will serve as a source of raw materials for a new iron and steel complex. In Croatia exploration has shown that the Topusko-Kostajnica-Bosanski Novi triangle is rich in iron ore; while explorations in Debeljak, in the Velebit mountains of the Lika, and at Jablanica in Herzegovina, disclosed iron ore deposits containing a small percentage of manganese. Other teams are exploring the Novo Brdo-Janjevo-Lece area in South Serbia, one outcrop of which is the Trepča mine. Teams which previously visited this region discovered considerable deposits of lead-zinc ore, but it was considered that their exploitation would be unprofitable because of the low lead content of the ore. In Istria, large deposits of hard coal have been found to the north-west of the Raski basin, where the known reserves mapped so far amount to several million tons. Prospecting work is also being carried out on the asphalt deposits of Dalmatia, while the extent of the clay deposits is being determined in connection with a new ceramic plant which is being built at Potjani.

A problem for technologists is presented by iron ores containing from 4 to 7 per cent manganese. So far only small manganese mines exist, but processes for the extraction of this metal are being tried out.

The coal output is being increased by 2,000,000 tonnes a year. New power plants with a combined capacity of 100,000 kW. were scheduled to come into operation in 1952



and another six with an output of 60,000 kW. should be completed this year. Yugoslavia's water power is regarded as an important export factor. At present the country is producing 4,000,000,000 kilowatt-hours annually, but once the present industrialization plans are carried out this figure could rise to between 500,000,000,000 and 600,000,000,000 kilowatt-hours. Much of this power could be exported to Central Europe, especially Western Germany.

### A NEW RAILWAY

Work will start next year on the largest engineering project undertaken in Yugoslavia since the war, which is a 310-miles long railway to link Belgrade with Bar on the Adriatic coast. The new port will cost about £1,334,000 to build and is scheduled to handle about 1,500,000 tons of commerce a year. The railway, which will be the first real communication link between the republics of Serbia and Montenegro, is expected to have a marked influence on the interior economies of these territories. It will open up coal basins in the Kolubara valley and round Plevje. In Montenegro there are substantial deposits of bauxite to be exploited, as well as lead and zinc mines, and oil has been struck near the Bay of Bar. This railway will also make

possible the building of 23 hydro-electric plants along the swift-flowing river Lim.

This vast programme of mining and industrial expansion will not, of course, be carried out without overcoming many difficulties, one of the most formidable being the acute shortage of technicians. A large training scheme is in progress, however, and the workers appear to be co-operating enthusiastically in the various schemes. By the new system operating in Yugoslav industry, they are entitled to a substantial share in surplus profits made through increased production or by the reduction of production costs. At Trepça mine the accumulated sum amounted last year to 150,000,000 dinars. Mindful of the danger of inflation, the Workers' Council decided that instead of being distributed individually, the surplus of their wages fund should be used for communal development. It is therefore being applied to the construction of a new first-aid station, a laundry, and a trolley-bus line. A similar decision was taken by the miners at Bor, whose surplus, amounting to 52,000,000 dinars, is being used for the repair of houses.

As part of a project to assist the country to improve its skilled labour force, a number of foremen-instructors have been sent to Yugoslavia by the I.L.O. At the same time, Yugoslav workers are being placed in industrial jobs in other European countries for training.

## Mining in Morocco in 1952

The value of Moroccan mineral output in 1952 rose to £43,000,000, an increase of 15 per cent compared with 1951, despite a fall in lead and zinc prices and a reduction in phosphate sales. Among ore exports, lead, zinc, manganese and iron showed a marked increase during the year under review.

Comparative production figures, in thousands of tons, are:

	1951	1952
Phosphates .....	4,500	3,800
Anthracite .....	380	440
Iron Ore .....	500	640
Manganese .....	360	400
Lead Ore .....	85	115
Crude Oil .....	65	100
Salt .....	60	95
Zinc Ore .....	45	50
Cobalt Ore .....	6	9
Antimony .....	1.5	1.6

The year 1952 marks the successful completion of Morocco's Four<sup>th</sup> Year Development Plan of 1948-1952, which has helped to raise mining production to double the pre-war rate.

### PHOSPHATE AND ANTHRACITE

The phosphate trade suffered a slight slump, with a fall in demand during the first months of 1952. However, the trend was short-lived; and the state monopoly ended by paying £5,500,000 into the Moroccan budget, as compared with only three-fifths of that amount in 1951. The programme for the current year calls for the extraction of 3,200,000 tons at Khouribga, in central Morocco, and 800,000 tons at Louis Gentil, east of Safi. Morocco's pre-war output was about 1,500,000 tons annually.

Anthracite production has expanded rapidly during the past few years. The Jerada mines, on the eastern border of Morocco, were first discovered in 1908; but production did not start until 1930. By 1938, annual production had reached 141,000 tons. In 1946, the finances of Charbonnages Nord-Africains were reorganized, ownership being divided into equal thirds between the French State, the Moroccan State, and private shareholders. A major equipment programme was begun to expand operations. During

1952 a new washing-plant was installed, with a capacity of 250 tons/hour. In addition, a 27-mile branch railway line was inaugurated, running from Guenfouda, on the main Mediterranean-Niger railway, to the washing-plant installed at the southern basin of the Jerada mine. The new line has seven tunnels, one over a mile long, and was constructed by the Moroccan Protectorate at a cost of some £2,000,000. It will vastly speed up shipment of the coal by eliminating the old inefficient aerial tram which formerly carried output from the mine to Guenfouda. Production is planned to run at a rate of 800,000 tons annually by the end of this year, an output sufficient to cover French North Africa's current requirements, and thus end the need for imports.

### GENERAL MODERNIZATION

Morocco is the only French dependency now producing manganese. The four-year plan for equipment and modernization of mines has raised production from 103,000 tons in 1947 to the present level of 400,000 tons.

The lead and zinc mines at Bou-Beker, south of Oujda, have likewise been modernized and expanded, thanks largely to £2,600,000 of Marshall Plan aid to the Société des Mines de Zellidja. Mechanization of the mine and construction of an entirely new mill, including a crushing section and the addition of grinding and flotation facilities, have doubled lead production over the past three years. Zinc output, which was almost negligible until 1950, is expected to reach 120,000 tons within a few years. Development of the Bou-Beker mine will help France to become self-sufficient in these two metals and eventually enable her to export them.

Crude oil from the petroleum field in the Rharb valley of north-central Morocco was produced in small quantities shortly before the war. Tapping of the new Sidi Fili oil field has expanded output sixfold since 1949.

Mineral prospecting during 1952 met with success. Lead in the Haouz region, asbestos in N'Keb and North Siroua, and wolfram in Hassian Diab are recently-discovered deposits on which exploitation is ready to start. In 1953, the exploitation of wolfram at Hassian Diab will involve the expenditure of £600,000.

# The Airborne Radiation Detector

The development of the airborne radiation detector is a factor which considerably increases the potential value of aerial survey work. This instrument can detect radio-activity from the air and is a development of a Canadian company of the Hunting Group. To the present, the unit has only been used in Lockheed Hudson aircraft and Canso flying boats. It is operated in conjunction with airborne magnetometer survey work and is an adjunct to the magnetometer survey. The following article presents a brief resumé of the operation of the detector, and describes its construction in some detail.

The prime function of the airborne radiation detector is to assist in the search for radio-active deposits. It has been proved that radio-active heights obtained from aircraft observations correspond to points of radio activity on the ground with a height of three times the normal background count being considered significant. Ground reference is established by means of a special 35 mm. camera which is time referenced to the airborne radiation recording media. The normal means of recording is by means of a traversable pen on a continuously moving paper strip. In radio activity, as in magnetometer survey flights, it is obviously desirable to get as close to the ground as is safely possible. The usual

installed on the operator's table. The counting rate meter and the graphic recorder are under the direct control of the operator at all times.

## DETAILS OF THE INSTRUMENT

The type 234 airborne radiation detector (A.R.D.), designed and produced by P.S.C. Applied Research Ltd., is a continuously-recording counting rate meter, operating on the scintillation counter principle. It is used in airborne geophysical surveys, usually in conjunction with vertical photography and magnetic measurements and measures the intensity of gamma radiation due to the proximity of significant radio-active mineral deposits at or near the surface of the ground.

The complete A.R.D. consists of four units joined by cables, which may be supplied in any desired length to suit the aircraft installation. The units comprise:

1. *The Detector Head.* Consists of an aluminium shell 6 in. in diameter and 17½ in. in height, containing the thallium activated sodium iodide crystal, a photomultiplier tube, a three-stage pulse amplifier and a lead shield. In order to ensure long crystal life without deterioration, the crystal is contained in a mineral oil bath. Including 35 lb. of lead, the total weight of the detector head is 44 lb.

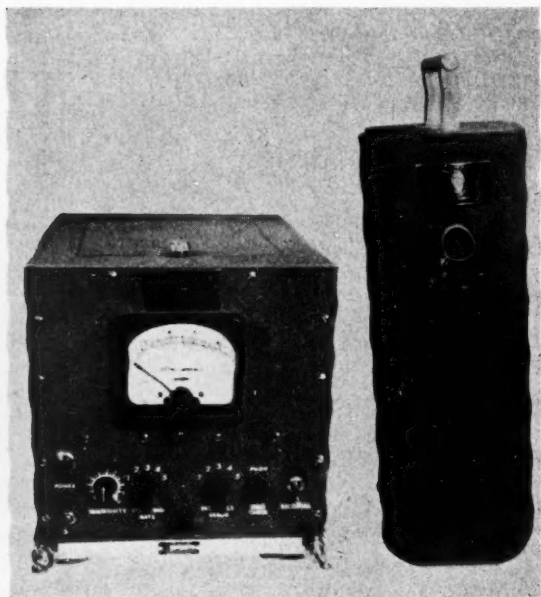
2. *Counting Rate Meter.* Contains the counting circuits, controls, integration time selection and a meter which may be used for visual indication of the gamma count if desired. The console dimensions are 10½ in. by 9½ in. panel size with a depth of 12½ in. and its weight is 23 lb. For tube heating and general voltage supply, a power input of 100 volts, 90 VA., 6-400 c.p.s. is required.

3. *High Voltage Battery Box.* A box is used to house from 10 to 12 small 90 volts dry batteries to provide the high voltage for the photomultiplier tube in the detector head. The life of these batteries is very long, and replacement is estimated at about 18 months of normal flying operation. The aluminium box is cork insulated to maintain a degree of temperature control during flight. Dimensions of the battery box are: width 10 in.; height 7 in.; and depth 13½ in.

4. *The Recorder.* This is a standard Esterline-Angus graphic recording milliammeter and provides a permanent record of the variation of radio active energy received by the detector head. A fiducial pen is included so that correlation between photography and radiation detection may be achieved. The recorder weighs 43 lb. and has a width of 11½ in., a height of 15½ in. and is 12½ in. in depth.

Considerable experience of surveying with the A.R.D. has proved it to be a very reliable instrument and it can be used with complete confidence where airborne radio-activity detection is desired. It is useful for location of commercial radio-active deposits or disseminated radio-activity as an aid in interpretive geology. The price of this instrument, including recorder and cables is \$4,200 f.o.b. Toronto and delivery can normally be made within four months of receipt of order.

The airborne radiation detector is regarded as yet another useful tool in the hands of the airborne surveyor and has been used with great success in Canada by Aeromagnetic Surveys Ltd., a Hunting Group Company, in conjunction with aeromagnetometer surveys. It is intended that the new equipment of Hunting Geophysics Ltd. will incorporate this instrument.



The Airborne Radiation Detector Mark II.

operating height is from 300 to 500 ft. above the earth's surface. Allowance must be made for type of ground cover.

Spurious anomalies such as cosmic radiation would, under normal circumstances, be regarded by the instrument as a region of high activity. Such effects are minimized by rendering the equipment insensitive to responses of short duration. The penalty for this measure is a limitation on the speed at which the aircraft may fly for optimum results.

So sensitive is the radiation detector that 35 millionths of an ounce of radium (1 mg.) has been detected at an altitude of 200 ft. from an aircraft flying at an air speed of 150 m.p.h.

Radio-active dials on flight instruments will have a disturbing influence if the airborne radiation detector is mounted in close proximity to them. For this reason the detector head of the detector is normally mounted in the rear of the fuselage. The detector head is mounted within a shock insulated ringmount which can be levelled to the vertical in compensation of aircraft pitch and roll. Of interest is the fact that the detector head need not be mounted over an open hatch since the shielding effect of the aircraft's skin is negligible. The counting rate meter may be mounted in a more forward position within the aircraft and is usually

## MACHINERY AND EQUIPMENT

### Specialized Hoses for Mines and Quarries

While consideration of equipment designed for use in the mining and quarrying industries normally brings to mind an image of some metal product ranging from headgear to airleg, it is nevertheless certain that without the assistance given by the various ancillary equipments, the former more traditional units might be rendered less effective in performance. A range of comprehensive booklets which emphasize the importance of the ancillary equipments used in mine and quarry have recently been published by George Angus and Co. Ltd.

Designed to convey air at high pressure and for use with compressors or rock drills the Angus air hose is available in both wrapped and moulded types. The former is supplied in maximum lengths of 60 ft., and the latter in maximum lengths of 500 ft., diameters up to 1 in. and up to 250 ft. in larger diameters. Both types have oil resistant linings. The company's coal cutter hose is an air hose specially designed for underground use, and has an oil resistant lining. This unit is supplied in diameters of 2 in., 2½ in., and 3 in., at 5- or 6-ply in each diameter and at bursting pressures ranging from 400 lb. per sq. in. to 550 lb. per sq. in. Weight ranges from 73 lb. to 98 lb. per length of 60 ft.

All unnecessary weight has been "eliminated" by reinforcing the rubber lining of the Fire Fighter Fortress Hose, so that it weighs only 16 oz. per yard at 2½ in. diameter. This equipment is recommended by the manufacturers for use in collieries, as the unit is highly flexible. The underground fire hydrants of screwdown pattern, in keeping with all the hydrants supplied by the firm, are being manufactured in accordance with British Standard No. 750/1937. The Type 2 Screwdown Pattern is a streamline hydrant of 7½ in. diameter inlet drilled to 3 in. B.S.T. "C" and outlet of gunmetal flanged adaptor screwed 2½ in. round thread to B.S. 336/1936.

### Denver's Wide Range of Mining Equipment

The Denver Equipment Company of America continues its considerable activities on behalf of the mining industry, and a series of pamphlets recently received present details of latest units for the mining industry manufactured by the company.

Suitable for mine surface or quarry installation are the forced feed jaw crushers, manufactured in types H and J. Type H crushers are equipped with anti-friction bumper bearings and bronze side bearings, while type J have anti-friction bumper bearings and anti-friction side bearings. Apart from the laboratory crushers in the H range, sizes for H crushers range from 5 in. by 6 in. to 10 in. by 16 in. The type J crushers range from 10 in. by 24 in. to 25 in. by 40 in.

Sand pumps comprise the SRL or open runner type and the SRL-C or closed runner type. The former type grades in dimensions from 2 in. by 2 in. to 6 in. by 6 in., and the latter type from 3 in. by 3 in. to 10 in. by 8 in. In manufacture of Denver-Dillon vibrating screens, flywheel weights counter-balance the screen on an eccentric shaft and all weight is suspended on springs. Denver automatic wet or dry samplers are equipped with synchronous motor-driven adjustable time switch, a gear motor with magnetic brake to prevent overtravel of the cutter, a rolling carriage and other fittings.

In the operation process of the company's self-rotating pulp distributor, pulp flows through the feedwell into the rotating head and out through the angled distribution ports into the discharge tank. The reactive force produced as the pulp flows from the ports turns the distributor head and as the head revolves, pulp is distributed evenly to the various compartments of the discharge tank. Pulp for the various circuits being fed flows from the outlets in the bottom of the discharge tanks. The machine consists of a revolving feedwell and distributor head, and a stationary discharge tank.

Samplers for wet or dry sampling, manufactured by the company, comprise a wide range of units, and include the model L for laboratory sampling, the Vezin type of ore sampler, the Snyder type ore sampler and other equipments. The automatic sampler is presented by the manufacturers as meeting the ten basic requirements of accurate sampling. Among these are the realizations that the sampler takes a complete cross section of

sample, at constant intervals between cuts, and that these cuts in turn contain equal percentages from all parts of the flow. Depth and distance of the cutter is important, as is frequency of cuts. Cutter speed is fixed at 7.5 in. per sec.

The Sub-A flotation machines are built to standard specifications, and three distinct zones of action take place within the Sub-A cell. In the agitation zone the pulp is intimately diffused with minute air bubbles, in the separation zone the bubbles assure the quiescence which permits the mineral laden bubbles to separate from the gangue without dropping the minerals, and in the concentrate zone the mineral laden froth is removed by froth paddles.

### Fog Sprays Settle Coal Dust

By adding three additional "fog nozzles" to the head of a continuous automatic mining machine, the problem of controlling coal dust was solved in an American coal-mine, according to *Mechanization*. Although the machine was already equipped with three fog nozzles, these additional nozzles with an increase in the pressure of the water spray, were found to be necessary to control the dust. The solution required several months of experiment.

When the operators of Saginaw Mine, Ohio, began to use continuous mining machines, each machine was equipped with three spray nozzles. A high pressure pump, similar to an agricultural spray pump and operated by a 5 h.p. motor, supplied water to the nozzles at 300 lb. per sq. in. Because this pressure did not create enough spray to allay the dust, two more sprays were added under the machine head. This experiment, however, still did not give the desired result, and the two experimental sprays were consequently removed. The next experiment consisted in adding three fog nozzles on top of the machine head, spacing them between rows of cutting chains so as to direct fog into places not affected by the original nozzles. At the same time, the water pressure was increased to 400 lb. per sq. in. The arrangement produced an effective fog.

The fog produced does not make the mine too damp for comfort and production. It requires only an estimated four gallons of water per ton of coal mined. The spray system operates automatically. The water passes through the fog nozzles only during sumping and shearing operations. Soon after the sumping jacks begin to extend the head of the machine, the water control opens, and water flows until the head retracts. Before it reaches the fully retracted position, the movement of the head activates a cut-off valve and shuts off the water.

### Medium Voltage Underground Joint and Service Boxes

The medium voltage underground and service boxes manufactured by British Insulated Callender's Cables Ltd. are designed for use with paper insulated cables buried in the ground, and for voltages up to and including 660 volts.

This range of cast iron compound sealed joint boxes includes straight joint, tee or service, parallel entry service, double branch service and double branch service of the cross type boxes. These boxes, with the exception of the parallel entry unit, are all of the lid type in which the body of the box extends well above the cable level, and a loose die is used to close the U-shaped cable entry. Each lid has a large central hole for final filling.

A comprehensive brochure published by the manufacturers gives details of these units and of pressed copper service boxes, lead sleeves and service boxes and cable entry and bonding arrangements.

### Fiat Tractor: An Alternative Steering Device

It has been announced by Mackay Industrial Equipment Ltd. that the Model 55 Fiat Crawler Tractor can now be supplied with steering lever control as an alternative to wheeled steering. The 55L, like all Fiat machines, is steered by the orthodox method incorporating multi-plate clutches and brakes, and the availability of either levers or wheel gives the contractor the choice of whichever method of control is preferred.



## METALS, MINERALS AND ALLOYS

The course of events indicates continued loosening of controls in the various branches of the mineral industry. This week the United States Government has abolished all the remaining these controls are taken off international movement of the chemicals. The Canadian Government has lifted controls on the purchase and sale of primary copper and aluminium. As these controls are taken off international movement of the various materials is facilitated and temporarily, at least, the fact is making for the stimulation of a buyers' market. Larger quantities of primary metal were exported from Canada in January than a year ago, more particularly primary aluminium, refined lead, and zinc. Exports of copper were lower. The bulk of these exports went to the United States.

An optimistic view is expressed for the prospects of sales in the U.S. during the next six months by the *Iron Age*. Demand is surprisingly firm, raw material adequate and expansion programmes going well. With steel generally regarded as a trade barometer other branches of the metal trades should reflect this confidence.

**COPPER.**—Dealers in the United States are disposed to hold their hand until their April copper allocations are given out.

Offers by Belgian and Canadian producers of metal for early delivery at 35 c. delivered Valley points failed to interest buyers, and domestic custom smelters have recently reduced their price for copper refined from foreign material to 34 c.

The Copper Institute figures of United States output in February was 83,050 s.tons of crude (81,625 s.tons in January). Production of refined was 101,538 s.tons (108,010 s.tons). Domestic deliveries were 117,204 s.tons (125,133 s.tons) and stocks increased to 60,944 s.tons (59,836 s.tons). Outside the United States crude production was 119,724 s.tons (123,361 s.tons); refined output was 88,539 s.tons (93,667 s.tons); refined stocks at the end of the month were 122,223 s.tons (120,629).

The strike at the Chuquicamata mine in Chile continues and the Government, following the refusal of the workers to accept the settlement proposed by the Minister of Economy, has ordered 800 workers back to work. This ultimatum was effective and the strikers voted to return to work yesterday.

The Chilean Government naturally is reluctant to see a continuation of the copper strike which, during its fortnight's existence, has cost the Exchequer a loss of some P.425,000,000 as a result of a loss of some 700 tons of output daily. The Chilean Government is also faced with the increased price of domestic copper in the United States as presumably it will have to raise the prices paid to American mines in Chile from which it has hitherto bought its copper at the old domestic price of 24½ c. Reports have been in circulation that Chile intended to approach the United States Government with a view to the solution of their difficulty.

No agreement appears to have been reached so far in the conciliation proceedings between the mining companies and the European Mine Workers' Union in Northern Rhodesia. The Union stated that they would refer the future course of the dispute to their various branches.

It is reported from Uganda that it has been found necessary to make big changes in the plans for the Kilemba copper and cobalt mine situated on the slopes of Mt. Ruwenzori in Western Uganda, which is under development by Frobisher and Rio Tinto. Thirty-five European members of the staff are stated to

have been sent home; among other details it is proposed to change the location of the smelting plant. A full statement has been promised shortly.

Japanese production of rolled copper products last year is given as 88,916 tonnes as against 84,697 tonnes in 1951.

Test consignments of copper mined in the Negeb in the south of Israel have been sent to Belgium and the U.S. for experimental production studies.

**LEAD.**—The general market situation shows little change. The amount held by the British Government and the possible policy in the future is discussed elsewhere in "Notes and Comments."

The Bolivian Government is reported to have cancelled its agreement with an Argentine financial group for the construction of a tin smelter.

**TIN.**—There is little of current interest to record regarding tin this week. The outlook at large is discussed more at length in our "Notes and Comments." The High Commissioner in Malaya, General Templer, has given an encouraging report on the progress in suppressing Communist activities. The Government, he said, was in touch with the International Bank for reconstruction development with a view to arranging a basic survey of Malaya's economic resources and needs; were this possible it could well lead to an increased flow of outside capital into the Federation. Straits shipments in the first half of March were 3,884 tons.

**ZINC.**—The decline in zinc prices in the U.S. appears to have been halted since it was officially announced that the G.S.A. had purchased all the zinc offered by producers against their inquiry for the metal last week. The purchases comprised only prime Western for which around the open market price of 11 c. E.St. Louis was paid. The amount purchased is estimated in the trade at 20,000 s.tons or over and is for the security stockpile—delivery within 90 days. The publicity given to the deal is no doubt intended to reassure the market as to the stability of the present price.

Canadian exports were heavy in January and amounted to 34,956 s.tons (of which 15,265 tons went to the U.S. and 19,682 tons to the U.K.) as compared with 18,418 in January last year.

Mexican production during last year increased markedly, the average monthly figure being 18,948 tonnes compared with 11,391 tonnes in 1951.

**ALUMINIUM.**—A general loosening in the supply of aluminium appears to be in progress. European metal has been rather freely offered in New York at a duty-paid landed price of 22 c. per lb. but without attracting much interest. A meeting of the O.D.M., the N.P.A., and domestic producers was held last week to decide what aluminium could be made available for the Government stockpile. The producers are said to have urged the lowering of stockpile specifications so that the supply sources could be broadened. No stockpile deliveries have been made for the past eighteen months. Canadian exports of primary and semi-fabricated aluminium in January totalled 69,369 s.tons compared with 41,039 in January, 1952; the great bulk of this supply went to the U.S.

**ASBESTOS.**—Reporting on the market the Philadelphia organ *Asbestos* says that the general market situation continues good.

U.K. PRIMARY METAL STATISTICS—JANUARY  
(long tons)

	Refined Copper			Lead†			Slab zinc			Tin metal		
	Jan. 1953	Jan. 1952	Jan.-Dec. 1952	Jan. 1953	Jan. 1952	Jan.-Dec. 1952	Jan. 1953	Jan. 1952	Jan.-Dec. 1952	Jan. 1953	Jan. 1952	Jan.-Dec. 1952
U.K. stocks beginning period §	91,548	87,251	87,251	23,090‡	77,167	77,167	166,050	39,659	39,659	4,225	8,004	8,004
Imports	15,560	18,926	212,145	21,864	27,066	146,811	18,201	16,958	229,181	67	713	2,885
Production	12,162	12,491	151,701	5,444	5,933	85,785	4,976	4,841	68,733	2,212*	2,873*	29,521*
Consumption	24,850	31,613	347,646	19,366	17,888	194,650	14,376	18,812	170,885	1,722	2,287	22,555
Exports and Re-exports	77	70	684	6,916	78	42,641	22	15	144	938	276	21,928
U.K. stocks end period §	90,708	84,117	91,548	27,486‡	89,831	75,510	16,545‡	44,539	166,050	3,866	9,408	4,225

(Source: British Bureau of Non-Ferrous Metal Statistics)

\*Estimated by International Tin Study Group.  
Government stocks other than strategic reserves.  
61,346 tons; and of tin in ore were 1,931 tons.

†Includes imported virgin lead and English refined from domestic ore and secondary metal.  
‡In addition U.K. stocks of blister copper at the end of January were 44,513 tons; of zinc concentrates were 4,225 tons.  
§Excluding Government held stocks.



Removal of many price controls has led to confused price levels in some markets but in general the inflationary effects of such moves have been slight. Many economists, in fact, predict generally lower price levels later this year. Farm prices and total farm income are both trending lower, and should this trend continue with no corresponding lowering of industrial prices an unbalanced situation might be created which until corrected could lead to unsettled conditions in the whole economy. Little change has taken place in the raw asbestos situation during the past month. The demand remains high with some tapering off in the lower grades. There is every indication that there will be no let-up in demand during the year.

**GOLD.**—U.S. gold stocks continue slowly to decline and amounted last week to \$22,611,000,000. Mexican production last year showed a substantial increase, the average monthly output being reported at 38,343 oz. compared with 32,181 oz. in 1951.

## Iron and Steel

In revising the schedule of prices of iron and steel products to take account of the recent rise in the price of coal, the Minister of Supply has acted with commendable promptitude. On Saturday last—12 days after the advance in coal prices—the Minister authorized a general rise in iron and steel prices ranging from 6s. 6d. per ton for low phosphorus iron and 10s. for foundry and forge iron, to 12s. 6d. on steel plates, and 13s. 6d. on galvanized sheets. These rises, which represent an average of between 1 and 1½ per cent, are carefully calculated to correspond precisely with the extra cost of fuel and take no account of other substantial rises in manufacturing costs since the last general revision of steel prices in February, 1952.

On the subject of the supposedly impending decontrol of steel, the Government is not yet in a position to make a statement. In usually well informed circles it has been freely stated that rationing would be abolished at the end of the month, but it is now suggested that the necessary arrangements for so momentous a change may not be completed so soon. Only the timing seems to be in doubt. Apart from plates the steel makers are now in a position to meet all reasonable demands and in view of the disturbing effect of the uncertainty which now prevails the Government is expected, at an early opportunity, to define its intentions in regard to the restoration of a free market.

It is true that the allocations for the second quarter of the year have already been fixed and for that reason it has been assumed that rationing might continue until June 30. The agitation for the liberation of the industry from the restrictions of controlled distribution has, however, become most insistent and there are no technical reasons why this momentous change should be deferred for another three months.

Deliveries of steel are now on an impressive scale, production continues to increase and stocks have been built up to such an extent that "hoarding" has become unnecessary. Only the shipbuilding industry is now seriously hampered by short supplies and it may be that if and when other supplies are decontrolled, the allocation of steel plates will be continued.

## The London Metal Market

The copper markets throughout the world show very little change from last week, and there has been no further news about the possible re-opening of dealings on the London Metal Exchange. However, labour trouble in any of the major copper-producing areas would not have to be of long duration before the present state of approximate equality in supply and demand was upset to such an extent that the re-opening of a free market would present almost insuperable problems.

The stocks of tin in official warehouses increased slightly and there has been a corresponding narrowing of the backwardation, but activity has remained at a very low level. Shipments of tin from the East show increasing tonnages being shipped to Europe, and it can be assumed that the majority of these is for reshipment to America, enabling the European operator to make a currency profit. It is to be hoped that the transferable sterling rate soon improves sufficiently to enable the old-established tin-dealing houses to regain the trade. The Eastern price on Thursday morning was equivalent to £959 10s. per ton c.i.f. Europe.

The lead price has fluctuated within narrow limits, but there has been a freer supply of metal for March settlement and the backwardation has, therefore, shown a tendency to decrease. It is expected that shipments from Australia will start arriving again in May, and by that time the position should give rise to a small contango which will help the market in many ways. Demand has been reasonably good both in Europe and in America, and producers have not had very much difficulty in disposing of their intakes.

The zinc market has again been featureless, and consumers are showing continued reluctance to enter the market. The G.S.A.'s action in accepting all metal tendered in response to its last week's enquiry will undoubtedly relieve selling pressure across the Atlantic, and may impart a better tone throughout the world in conjunction with the reluctance of some European smelters to sell under £80 a ton.

Closing prices and turnovers for the week are given in the following table:—

	March 12		March 19	
	Buyers	Sellers	Buyers	Sellers
<b>Tin</b>				
Cash .....	£955	£956	£941	£942
Three months .....	£943	£944	£937	£938
Settlement .....		£956		£942
Week's turnover .....		280 tons		420 tons
<b>Lead</b>				
Current month .....	£89	£89½	£90	£90½
Three months .....	£86½	£87	£87½	£88
Week's turnover .....		6,125 tons		3,525 tons
<b>Zinc</b>				
Current month .....	£78	£78½	£79½	£79½
Three months .....	£78½	£78½	£79½	£79½
Week's turnover .....		4,800 tons		3,750 tons

### MARCH 19 PRICES

#### COPPER

Electrolytic .. .. . £285 0 0 d/d

#### TIN, LEAD AND ZINC

(See our London Metal Exchange report for Thursday's prices)

#### ANTIMONY

English (99%) delivered,  
10 cwt. and over .. .. £225 per ton  
Crude (70%) .. .. £210 per ton  
Ore (60% basis) .. .. 20s. — 22s. nom. per unit, c.i.f.

#### NICKEL

99.5% (home trade) .. .. £483 per ton

#### OTHER METALS

Aluminium, £166 per ton  
Bismuth  
(min. 5 cwt. lots) 17s. lb.  
Cadmium (Empire), 14s. 4d. lb.  
Chromium, 6s. 5d./7s. 6d. lb.  
Cobalt, 20s. lb.  
Gold, 248s. f.oz.  
Iridium, £60 oz. nom.  
Magnesium, 2s. 10½d. lb.  
Manganese Metal (96%-98%)  
£280/£295  
Osmiridium, £40 oz. nom.  
Osmium, £65/70 oz. nom.  
Palladium, £7 15s./£8 10s. oz.  
Platinum, £27/£33 5s.  
Rhodium, £42 10s. oz.  
Ruthenium, £25 oz.  
Quicksilver, £70 10s./£71 ex-warehouse  
Selenium, 30s. 6d. nom. per lb.  
Silver 74d. f.oz. spot and f'd.  
Tellurium, 18s./19s. lb.

#### ORES, ALLOYS, ETC.

Bismuth .. .. . 30% 9s. 6d. lb. c.i.f.  
20% 8s. 6d. lb. c.i.f.  
Chrome Ore—  
Rhodesian Metallurgical (lumpy) £13 2s. per ton c.i.f.  
" (concentrates) £13 2s. per ton c.i.f.  
" Refractory £12 14s. per ton c.i.f.  
Baluchistan Metallurgical £14 15s. 6d. per ton c.i.f.  
Magnesite, ground calcined .. £26 - £27 d/d  
Magnesite, Raw .. .. £10 - £11 d/d  
Molybdenite (85% basis) .. 103s. 10½d. per unit c.i.f.  
Wolfram (65%) .. .. World buying 310s. - 320s.  
" .. .. 352s. 6d. Selling  
Scheelite .. .. World buying 290s. - 300s.  
" .. .. 342s. 6d. Selling  
Tungsten Metal Powder .. 30s. 8d. nom. per lb. (home)  
(for steel manufacture)  
Ferro-tungsten .. .. 25/3-25/9 nom. per lb. (home)  
Carbide, 4-cwt. lots .. .. £35 13s. 9d. d/d per ton  
Ferro-manganese, home .. £49 15s. 0d. per ton  
Manganese Ore U.K.  
(48%-50%) .. .. 6s. 1d. per unit  
Brass Wire .. .. 2s. 7½d. per lb. basis  
Brass Tubes, solid drawn .. 2s. 1½d. per lb. basis



## COMPANY NEWS AND VIEWS

### Inco Produces More, Earns Less, Pays Same

The International Nickel Company of Canada during 1952 produced from underground and surface combined, a total of over 13,000,000 tons of ore—the highest production in the company's history. This was made possible by the company's underground expansion programme which raised underground production to 10,200,000 tons, an increase of more than 30 per cent over 1951 and 75 per cent over 1950.

#### Deliveries of INCO's principal products in 1951-1952

Year	Nickel* lb. (000)	Copper† lb. (000)	Products‡ lb. (000)	Platinum Metals (oz.)	Gold (oz.)	Silver (oz.)
1952 ..	249,017	234,323	92,350	287,135	42,396	1,076,327
1951 ..	243,865	236,954	79,160	375,438	38,016	1,027,921

\* All forms. † Refined. ‡ Mill and foundry products. The nickel content of the mill and foundry products was 67,599,186 lb. (1951 - 60,175,252 lb.). These figures are included in the totals given under Nickel.

Net earnings for the year of U.S. \$58,891,282, after provision for dividends on the preferred shares, were equivalent to U.S. \$3.90 per share compared with U.S. \$4.17 in 1951 and U.S. \$3.21 per share in 1950.

Year	Working Profit U.S.\$	Taxation* U.S.\$	Net Profit U.S.\$	Dividend per share U.S.\$	Carry forward U.S.\$
1952 ..	118,962,585	43,598,993	58,891,282	2.60	158,467,172
1951 ..	126,831,710	48,148,718	62,875,571	2.60	139,413,028

\* Including U.S. \$30,284,453 reserved for Canadian Taxes.

The decrease in earnings was due to the depreciation of the United States dollar in relation to the Canadian dollar in which the company's sales are principally made, relative to the Canadian dollar, in which the company's costs are incurred.

Editorial comment will be found on page 326.

### Anglo-French Maintain Steady Progress

The full report and accounts of Anglo-French exploration covering the year ended December 31, 1952, presents a picture of steady progress.

The gross revenue for the year amounted to £95,685 (£107,742) of which dividend income and interest—gross—accounted for £75,828 compared with £71,976. Profit realized from sales of farms and land at £3,542 was virtually unchanged from the previous year when it brought in £3,067. The only major change in revenue occurred in the item, profit realized by sales of shares and sundry credits which at £16,315 was down by a little more than half the previous year's figure of £32,699. General expenses were less, £16,646 against £18,137, as were taxation liabilities which contracted to £47,101 compared with £55,772. Net profit was £31,938 against £33,833.

The dividend on the £1 ordinary units comprising the £800,000 issued capital was maintained at 7½ per cent which required a net £31,500 leaving the carry forward slightly higher at £29,548 compared with £29,110 brought in.

Quoted investments stood in the balance sheet at a book cost of £944,127 (£922,242) and unquoted investments at a book cost of £43,945 (£39,776) giving a total book cost for its investments of £988,072 against £962,018 previously. The market value at the end of 1952 of its quoted holdings was £1,148,028. Current assets totalled £90,579 and current liabilities, £77,529.

During the year the company added Harmony Gold Mines and Messina (Transvaal) Development Company to its portfolio which at the end of the preceding year was made up as between 59 per cent gold mining companies; 12.3 per cent oil; 10.4 per cent copper, lead and zinc; 10.3 per cent tin; 7.8 per cent coal; and 0.2 per cent miscellaneous.

Mr. F. R. Cottell is chairman. Meeting, London, April 1.

### Loraine Gold Mines Note Offer

Loraine Gold Mines have announced that shareholders are to be offered £500,000 out of the £5,500,000 6 per cent Registered

Unsecured Notes of the company which the Anglo American Corporation of South Africa recently undertook to take up.

The notes carry the free offer of an option until January 31, 1955, to subscribe at 12s. 6d. for one Loraine ordinary 10s. share for every £1 of notes. Any notes not subscribed will be taken up by the Anglo American Corporation. Should applications exceed £500,000 the directors "will allot the notes at their discretion to meet such applications so far as possible."

Application forms will be sent out on April 8 to shareholders registered on March 27, and the offer will close on April 27. Application has been made to the Treasury for consent to the issue in the United Kingdom and to the London and Johannesburg Stock Exchanges for permission to deal and quotations for the notes and relevant options.

### "West Africans" Good in February

The February production returns from the West African gold producers were generally good.

Amalgamated Banket caused a stir in the market when its monthly profit figure of only £9,183 was announced. This contrasted sharply with the January figure of £21,551 and was due, the company stated, to a fall in value of several underground stopes and a reduced tonnage from the low-grade Pepe opencast section. One wave does not make a flood, and the lower values encountered in the stopes should be viewed as exceptional until production figures for the next few months become available. The reduced tonnage from the Pepe section was occasioned by repairs to the aerial ropeway and ore sent to the mill from this source should be back to normal during the current month.

Ariston milled less than for some months past but gold recovery was well above average. Indications to date are that the company will show higher profits than in the previous year. Ashanti and Bibiani continued to make steady progress; Bibiani's profit figure being the highest monthly figure announced since February, 1952. Bremang showed improvement and results to date reveal that profits are nearly £10,000 up on the corresponding period last year.

Profits to date of Gold Coast Main Reef show that while gold production has advanced considerably, working profit is much the same as for the same period last year. But Konongo's results to date are better as are Marlu's, its February profit result being the best announced since November, 1951.

Taqua and Abosso continues to go from strength to strength and its deficit to date, with one more month to come to complete its financial year, has been reduced to under £14,000. This compares with a deficit last October of over £51,000.

Company	February, 1953			Months since year-end	Current Financial Year			Last Financial Year	Tons	Yield	Profit*
	Tons	Yield	Profit*		Tons	Yield	Profit*				Profit*
	(000)	(oz.)	(£000)		(000)	(oz.)	(£000)		(000)	(oz.)	(£000)
A.B.A. ....	60	8,613	9.8	5	295	45,506	96	253	43,398	117	
Ariston Gold ....	28	10,126	48.1	5	147	51,062	255	139	48,180	241	
Ashanti ....	23	15,000	80.3	5	112	74,500	387	97	74,478	396	
Bibiani (1927) ....	30	6,276	16.4	5	152	30,420	63	149	30,109	79	
Bremang† ....	600	2,801	12.0	2	1,196	5,537	17	948	4,754	8	
G.C.M.R. ....	9	3,542	12.5	8	69	26,462	84	68	24,715	85	
Konongo ....	2	2,227	10.4	5	12	11,112	51	11	11,010	49	
Marlu Gold ....	41	4,632	18.9	5	206	20,663	65	208	18,938	51	
Taqua and Abosso ....	25	6,170	12.9	11	148	58,451	L14	233	55,116	3	

\*Including premium revenue. As the basis of calculating monthly profits varies from company to company, a direct comparison one with another is not possible. The basis for any one company has, however, remained consistent unless otherwise indicated.

†Ore treated given in cu. yd.

L indicates a loss.

### "Indians" in February

The February production returns from the four Kolar Gold Field companies showed that operations were on a smaller scale than usual, even allowing for the shorter working month.

This description more rightly applies to milling results than to gold production. For Champion Reef, which has been announcing disappointing results for some time, recovered more gold last month than in any month since last October. Mysore, too, showed a high ratio of output per ton milled, although the



tonnage throughput showed a sharper decline than the shorter month would warrant, the figure being the lowest in over two years.

Nundydroog has not sent such a small tonnage to the mill since May, 1951, but the gold output indicated a higher-than-normal grade of ore being crushed, the output figure not being bettered except when tonnage milled has been over 20,000 tons. Ooregum was the most consistent of the four, the figures announced being a steady average and calling for no comment.

Company	February 1953		Months since year end	Current Financial Year		Last Financial Year
	Tons (000)	Yield (oz.)		Total to date Tons (000)	Yield (oz.)	Total to date Tons (000)
Champion Reef	10	4,025	2	21	7,816	28
Mysore	15	5,450	2	31	11,702	32
Nundydroog*	19	5,699	2	40	11,684	40
Ooregum	10	2,093	2	22	4,481	21
						Yield (oz.)
						11,659
						10,777
						9,488
						5,093

\*Includes tailings.

## Company Shorts

**De Beers Repeat 200 per cent Payment.**—De Beers Consolidated Mines are paying a final dividend of 6s. per share on the 5s. deferred shares which, with the interim payment declared in September last, makes a total distribution of 10s. per share, or 200 per cent, the same as for the preceding year. Although profit, before tax, declined by £1,023,156 to £11,915,399, taxation liabilities at £1,825,000 were lighter by £1,775,000 so that the freely available balance was £10,092,399 against £10,388,555 in 1951.

The effective rate of South African non-resident shareholders' tax is 7.5 per cent. Sir Ernest Oppenheimer is chairman.

**Gold and Base may Treble Columbite Output Under New Scheme.**—The interesting and important scheme under which Gold and Base Metal Mines of Nigeria may treble its output of columbite in the current year was announced in these columns in our issue of March 6 last.

Unfortunately, it was stated at that time that the Lirue-n-Kano District, where the operations are to take place, was described as being in Northern Rhodesia. This should, of course, have read the Lirue-n-Kano District of Northern Nigeria.

**Mashaba Rhodesian Secures Option to Purchase Rosey Cross Claim.**—The Mashaba Rhodesian Asbestos Company have announced that an agreement has been signed granting to Rhodesian Asbestos Ltd., of Toronto, an option to purchase the Rosey Cross claims at Mashaba for £35,714 at any time up to February 1, 1955. Monthly payments, the announcement states, are due to this company during the option period and these will be regarded as part of the purchase price if the option is exercised.

## Obituary

SIR ROBERT KOTZÉ

The death in Cape Town at the end of last week of Sir Robert Nelson Kotzé closes the career of a mining engineer who played an important part in the history of mining in South Africa. He

was born in the Cape Colony in 1870 and was educated at the South African College where he took his B.A. in Science and was a Gold Medalist. Later he went to the Clausthal School of Mines where he obtained diplomas in Mining and Metallurgy with distinction. In 1895 he returned to South Africa and started professional work. From 1896 to 1907 he was Consulting Engineer to the Transvaal Goldfields Company and its subsidiaries. In 1908 he was appointed Government Mining Engineer. His best known work in this position was the formulation of a basis for the leasing and exploitation of large areas in the Far East Rand and he was also responsible for many of Government's reports on mining. He was also closely associated with the progressive study of Miners' phthisis and in particular devised the konimeter which bears his name. He retired from his official position of Government Mining Engineer in 1926. Four years previous to that date he was appointed Vice-Chancellor of the Witwatersrand 1922-1925 and again in 1937. After his retirement he joined the board of De Beers Consolidated, African Explosives and Industry, Geduld Proprietary and East Geduld. He sat for Springs in the Union Parliament from 1929 to 1939 and was knighted in 1918.

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**MINING ENGINEERS** required for British Guiana. Age 25/40, must be single. University Degree and five years minimum experience open pit mining. Required to assist in supervision of operations using power shovels, draglines, bulldozers and tractor scrapers. Write full particulars, training and experience, to Box 531, The Mining Journal, 15 Wilson Street, Moorgate, London, E.C.2.

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## ARISTON GOLD MINES

## MAJ.-GEN. W. W. RICHARDS'S STATEMENT

The twenty-third annual general meeting of Ariston Gold Mines (1929), Ltd., was held on March 16 in London.

Major-General W. W. Richards, C.B., C.B.E., M.C., chairman of the company, presided.

The following is an extract from his statement which was circulated with the report and accounts:—

During the year ended September 30, 1952, the mill crushed 330,430 tons of ore or an average monthly crushing of 27,536 tons, from which was recovered 114,932 ounces of gold valued at £1,515,480.

This revenue is the highest in the company's history, and is due to the increased tonnage and recovery, also to the price we received for the gold throughout the year which averaged £13 3s 3d per ounce, the increase over the previous year being due to the sale since April last of the whole of our output at premium prices.

Costs averaged 56s 11d per ton, compared with 52s 2d for the previous year.

We are fully appreciative of the efforts which lie behind the raising of our gross revenue to £1,515,480. The amount provided for taxation is £253,787, an increase of £76,400 over last year, and represents 62 per cent. of the profits for the year. £171,000 of the tax is payable to the Gold Coast Colony, plus an amount of nearly £20,000 payable to the colony for gold and minerals duties.

Higher operating costs and the increased provision for taxation go a long way to offsetting the improved revenue, the net profit resulting being £155,441. With the amount brought forward and after making the adjustments shown in the profit and loss account, the amount available is £233,213. The Board recommend a final dividend of 6d per unit (20 per cent.), making a total dividend for the year of 9d per unit (30 per cent.), against a total of 7½d per unit (25 per cent.) for the previous year.

The Board have declared an interim dividend of 3d per unit (10 per cent.) on account of the year ending September 30, 1953.

Results since the close of the financial year under review have been appreciably better in tonnage crushed, gross revenue and mine working profit. The new 40,000 tons monthly capacity winder will be erected and operating in the course of the next twelvemonths, and the tonnage then progressively increased.

## ORE RESERVES

During the year the programme for the installation of gold recovery plant to treat 40,000 tons per month was completed.

At September 30 last, the ore reserves amounted to over 3,000,000 tons of an average value of 6.72 dwts. The Board has decided to continue the policy of limitation of underground development. Development has been carried out mainly in the section of the mine in the vicinity of the north ore-body.

Included in the ore reserves are 190,578 tons of better-than-average grade ore on the north ore-body between the 16th and 20th levels. No ore has been included in the reserves from the area below the 20th level, but the length of the reef has more than doubled between the 20th and 24th levels, which are 800 ft apart on the dip of the reef, and there is every expectation that from this area alone hundreds of thousands of tons will eventually be available for addition to the ore reserves. It will be most interesting to obtain the results of raises now being put in the reef from the 24th level. No. 3 winze is being sunk to service this ore-body down to the 30th level horizon.

Valuable additions to the ore reserves have been made from No. 2 ore-body in the main section of the mine. Development farther south towards the Gold Coast Main Reef Company's boundary has been limited, and under the present policy the amount and speed of the work in our section will be influenced by the Gold Coast Main Reef Company's own development results.

Under the Gorman Award relating to conditions of service of our native labour, it is necessary to charge annual sums in respect of gratuities payable on cessation of employment, and for the year the amount charged was £25,843. The accumulated liability to date in respect of Africans still in our employment was £41,083 as shown in the balance-sheet. This is an incentive which will foster the loyal co-operation we have always received from our native labour. We are continuing the provision of amenities as and when funds permit. I would mention, incidentally, that a swimming pool for the European staff was opened on January 1 last, and is greatly appreciated.

I am sure you will endorse the Board's action in conveying to our general manager, Mr. F. Clelland, A.M.I.M.M., and his staff on the mine our great appreciation of their efforts and of the services and advice of our technical advisers, the West African Gold Corporation, Ltd., through their resident director and chief engineer, Mr. G. Keith Allen, M.I.M.M.

The report and accounts were adopted.

## ZAMBESIA EXPLORING CO., LTD.

The Annual General Meeting of the Zambia Exploring Company, Limited, was held on March 18 at the Chartered Insurance Institute, E.C.2.

Capt. Rt. Hon. Charles Waterhouse, P.C., M.C., D.L., M.P., (Chairman), presided.

The following is an extract from the Chairman's Review circulated with the report and accounts for the year ended December 31, 1952:—

The results for the year 1952 reveal a profit, before taxation, of £91,899, compared with £166,609, for the Zambia Exploring Company, and £75,539 for the wholly-owned Zambia Investment Company, resulting in a total profit of £167,438.

After making provision for current taxation, which for the first time included full liability to Profits Tax, allowing for taxation of previous years under-provided, and bringing into account the balance brought forward from 1951, a balance of £121,747 remained available for distribution in the Parent Company. An Interim Dividend of 4 per cent., less tax, has been paid, and provision made for payment of the proposed Final Dividend of 6 per cent. and a Bonus of 5 per cent., both less tax, making a total distribution of 15 per cent. for the year.

The profits of the Zambia Investment Company, after provision for taxation, amount to £38,668. The profit of that company has been added to its balance carried forward from the previous year, which is thereby increased to £62,711.

During the year the range of securities held in other companies has been further extended and, at the 31st December, 1952, the market value of the quoted securities held, £660,292, was considerably in excess of the book figure of £455,965.

The increase in Income from Investments can largely be attributed to increased dividends from Tanganyika Concessions Limited.

TANGANYIKA CONCESSIONS LTD.—The consolidated results of the Company for the year ended 31st July, 1952, showed a profit after providing for taxation of £1,827,390, as compared with £1,101,676 for the previous year. Provision was made for the payment of a dividend of 8 per cent. on the Preference Shares and a dividend of 30 per cent. on the Ordinary Stock (both gross), leaving a balance unappropriated of £809,790. In addition, a special dividend of 10 per cent. (gross) on the Ordinary Stock was paid from Revenue Reserves, making a total dividend for the year of 40 per cent.

UNION MINIERE DU HAUT KATANGA—Mining extraction during 1951 totalled 4,762,000 metric tons of ores of all kinds, including copper, cobalt, zinc and uranium. The copper output of 191,959 metric tons was again a record. During the year the tonnage of metal in the new ore developed exceeded that in the ore mined.

BENGUELA RAILWAY COMPANY—The net revenue of the Benguela Railway Company for the year 1951 was Escudos 97,031,154.13, as compared with Escudos 67,427,587.59 for the previous year. Preliminary traffic results for the year 1952 reveal a further increase in the net operating receipts, which have risen from Escudos 124,646,816 to Escudos 169,662,361.

During the year ended 31st July, 1952, Tanganyika Concessions Ltd. received from the Benguela Railway Company £202,420 in respect of debenture redemption and £321,383 in respect of arrears of interest on their debenture holding.

RHODESIA-KATANGA CO. LTD.—Rhodesia-Katanga Co. Ltd. has entered into an Agreement with Anglo-American Corporation of South Africa Ltd. and others, providing for the formation in Northern Rhodesia of the Kansanshi Copper Mining Co. Ltd., to carry out further exploration of the Kansanshi Mine, including a deep-drilling programme, under the technical direction of Anglo-American Corporation of South Africa Ltd. Underground exploration of the mine and diamond drilling from the surface are being actively pursued. In a report on operations to 31st October, 1952, the Consulting Engineers state that there is no immediate prospect of an early assessment of the potential value of the property.

GEITA GOLD MINING CO. LTD.—Geita Gold Mining Co. Ltd., a private Company incorporated in Tanganyika Territory, holds mining leases over the Geita, Ridge 8 and Mawe Meru properties covering an area of about 11½ square miles, also 12 claims covering the lode at Prospect 30, and 32 claims adjacent to and in the vicinity of the other properties.

The ore reserves are in process of revaluation, but are estimated at 30th June, 1952, to be 1,912,785 long tons of ore at a grade of 3.7 dwts. per tons.

URUWIRA MINERALS LTD.—The accounts for the year ended 31st March, 1952, show that revenue from the sales of concentrates exceeded expenditure by £52,719. Ore reserves were estimated at 31st July, 1951, to amount to 3,000,000 tons, and it is stated that underground work has confirmed this estimate.

The report and accounts were adopted.

## OROVILLE DREDGING CO. LTD.

The annual general meeting of Oroville Dredging Company, Ltd., was held on March 19 in London. Sir Joseph Ball, K.B.E., chairman of the company, presiding.

The following is a summary of his statement, circulated with the report and accounts.

The consolidated net profit for the year to September 30, 1952, was £54,333, compared with £42,745 for the previous year. The dividend is maintained at 1s. 3d. per share and, after making a small transfer to investments reserve, £9,377 is added to the consolidated carry-forward. The balance sheet as a whole presents a strong position with relatively substantial liquid resources.

### MINING INTERESTS

Pato Consolidated Gold Dredging, Ltd., had a very successful year to December 31, 1951, with a net profit of \$2,727,826. For the year to December 31, 1952, recoveries continued at a high level and amounted to \$5,680,605 with gold at \$35 U.S. It is estimated by the Pato Consolidated management that production for 1953 and 1954 will continue at about the same rate, while in 1955 a drop to about \$4,600,000 is expected, after which production is estimated to decline to about \$3,000,000 in 1958. By that time the workable gravel reserves will be approximately 170,000,000 cubic yards of an average value of 17.5 cents per yard, which will be handled by the three large capacity dredges at a rate of about 14,000,000 yards a year. In the meantime, some additional gravel will no doubt be developed.

Asnazu Gold Dredging, Ltd., which, like Pato Consolidated, operates in the Republic of Colombia, South America, made a net profit for the year to December 31, 1951, of \$79,551. For the year to December 31, 1952, recoveries amounted to \$657,370 with gold at \$35 U.S. This company is now nearing the end of its operations. The economic position of Colombia is sound, but the political situation is somewhat disturbing.

The operating profit of Bulolo Gold Dredging, Ltd., to May 31, 1952, was \$1,710,716. Results for the year to May 31, 1953, should compare favourably with that figure, but it is estimated that profits for the years to May, 1954, and May, 1955, will decline drastically to approximately \$500,000 per annum, after which profits from dredging operations are expected to decline still further. With the three smaller dredges shut down by 1955, it is estimated that, provided there are no substantial increases in costs, the two large dredges should continue to operate until 1962 or 1963.

The company also has holdings in various mining companies operating in South Africa and in Australia. Certain of our interests in South Africa are now actively concerned in plans for the production of uranium, whilst our interest in gold production in Australia has benefited from the decision of the Commonwealth Government to permit the sale of newly-mined gold on premium markets overseas, provided such sales are made for U.S. dollars. At best, however, this premium has done little more than go some way towards assisting the gold mining industry to meet the spectacular increase in costs.

It seems reasonable to anticipate that, apart from factors outside our control, revenue will be maintained at a satisfactory level in the current year.

The report and accounts were adopted.

## Mining Matters

**Nigel Gold Investigates Uranium Occurrences.**—The Nigel Gold Mining Company has announced that the Minister of Mines has now authorized the company to investigate the occurrence of uranium bearing ores in the Nigel and Kimberley reef areas. The announcement, which is made with the permission of the Minister of Mines, added that while it was too early to be able to publish any information on this matter, shareholders are warned that owing to the reduced state of the ore reserves the possibility of becoming a uranium producer is remote.

**Sherwood Starr Ceases Mining Operations.**—Sherwood Starr Gold Mining Company has announced that on the advice of their consulting engineers mining operations ceased on the company's property, with effect from the end of February last. A tribute agreement has been entered into by the company and in future the mining property will be worked by a tributor under normal tribute arrangements.

**Captain Charles Waterhouse** has been elected chairman of Rhodesia-Katanga in succession to Sir Ulick Alexander who has resigned.

**Mr. Thomas Clair Murphy** has been appointed to the Colonial Mines Service to be an Inspector of Mines in Malaya.

The death is announced of Count G. M. Lecointre a director of Rand Selection Corporation.



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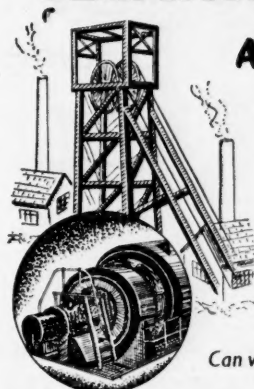
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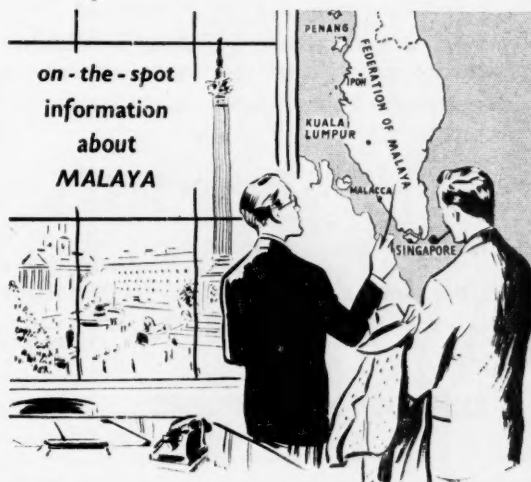
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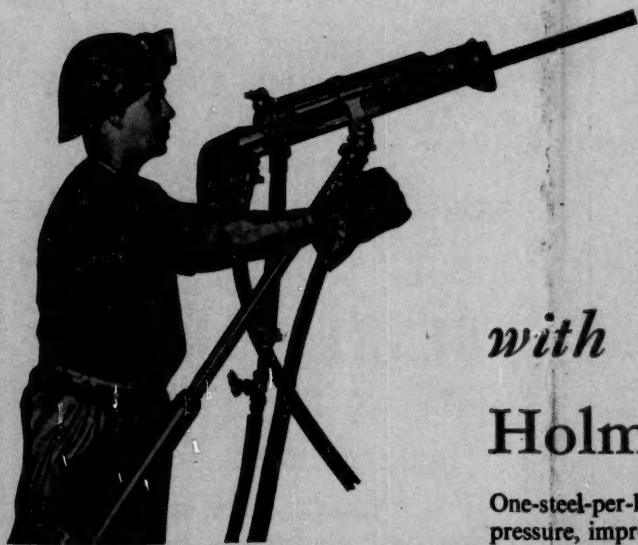


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